

the cable; further, the construction of telegraphic signal apparatuses able to utilise the first weak beginnings of the current arriving at the other end of the cable. These ultimately led to the invention of the siphon-recorder—a writing apparatus in which the tube containing the ink does not come into immediate contact with the strips of paper on which it has to write, and is therefore not hindered by friction from moving even under the least electro-magnetic impulse. By electric charges it is brought about that the ink spurts over the paper in a series of fine points.

The conclusion of the second volume is formed by the Bakerian Lecture for 1856, which gathers up the results of the author's investigations into the qualities of metals as displayed under the conduction of electric currents, and under magnetisation, and the changes they undergo in consequence of mechanical, thermal, and magnetic influences.

Let us hope for an early continuation of this interesting collection. There are still nearly thirty years of scientific activity on the part of the author to be accounted for. When we think of that we cannot fail to be astonished at the fruitfulness and unweariness of his intellect.

HERMANN L. F. HELMHOLTZ

OUR BOOK SHELF

Paradise Found. The Cradle of the Human Race at the North Pole. A Study of the Prehistoric World. By William F. Warren, S.T.D., LL.D., President of Boston University, &c. (London: Sampson Low and Co.)

IT has come to be an understood thing that when geologists or biologists propound theories as to past stages of life on the earth, and these theories attain to a certain popularity, some theologian shall twist the words of the Book of Genesis into a new interpretation, to show that this was what the inspired author meant all the time. A fresh musician has set Moses to dance to a new scientific tune. Since the publication of well-known modern views as to the diffusion of plants and animals from the Polar Region, it was to be expected that we should have a book proving that man was created in an Arctic Paradise with the Tree of Life at the North Pole; and here the book is. Other ancient cosmologies, such as the Greek and Indian, are made to bear their not always willing testimony. Those who take up the book should notice that the commendatory letters published from Professors Sayce, Tiele, and Whitney do not at all imply that these eminent scholars countenance the Polar Paradise doctrine. The President of Boston University seems to have sent them a paper some years ago on "Ancient Cosmology and Mythical Geography," their acknowledgments of which they are now perhaps hardly delighted to find figuring as certificates in a "Paradise Found."

Epping Forest. By Edward North Buxton, Verderer. (London: Stanford, 1885.)

THE public generally, and especially the people of London, and those who take some interest in natural history, are to be congratulated on the acquisition of so charmingly complete a little itinerary of Epping Forest as that now issued in a cheaper form by one of the Committee of Conservators, who is a resident on the borders, and an enthusiast as to the attractions of the Forest. It is, as the author observes in his preface, "hardly a desirable state of things" that so small a percentage of the summer visitors to the Forest "ever venture far from the point at which they are set down by train or vehicle;" and, with the choice of a score of

beautiful walks, described in Mr. Buxton's book, and the guidance of his six carefully prepared maps, five of which are on the scale of three inches to the mile, there is no longer any reason for their not venturing into those depths of the Forest in which its chief beauties are to be seen. The chapter on the history of the Forest which the author has wisely prefixed to the itinerary, that visitors may be reminded of the events which secured this magnificent playground for their enjoyment, is most complete, though it is to be regretted that the late City Solicitor, Sir Thomas Nelson, is not mentioned *by name* on p. 22. The practical character of the book may be gauged from the inclusion of railway time-tables, the fact that the distinctive letters of each route have been cut on trees at some points, and from such suggestions as that an east wind is, in Epping Forest, the best for views, because not smoke-laden. Personal experience has convinced the present writer of the skill with which the routes have been selected; the "objects of interest within and around the Forest," and their historical associations, are fully described and illustrated by some excellent drawings, the latter by Mr. Heywood Sumner; but what must render the work peculiarly gratifying to all lovers of nature, is the ample space—more than half the volume—devoted to the fauna and flora of the Forest. The mammals, reptiles, birds; the chief moths and butterflies; the trees, flowering plants, ferns, fungi, and mosses, are all enumerated, with general, *i.e.* not too specific, localities; and the notes on the mammals and birds will be of interest to naturalists in other districts. Such lists can, fortunately, never be complete; insects marked as "rare" are notoriously liable at any time to prove common: even since the publication of this work evidence has been produced suggesting the addition of *Sparganium neglectum* to the list of flowers, and each year's cryptogamic meeting of the Essex Field Club has as yet added several species to the catalogues of the lower plants. There may yet be room for a more pretentious monograph of Epping Forest, and, of course, from the naturalist's stand-point, so rich a collecting-ground affords material for a library of expository literature—the freshwater algae, for example, call for recognition;—but, for its purpose, the present work could hardly have been executed in a manner more creditable both to author and publisher.

G. S. BOULGER

Traité de Minéralogie appliquée aux Arts, à l'Industrie, au Commerce et à l'Agriculture, &c. Par Raoul Jagnaux. Avec 468 figures dans le texte. (Paris: Octave Doin, Éditeur, 1885.)

THIS work of 883 pages, as is stated in a title-page of corresponding length, is intended for the use of French students in their preparation for a degree in the subjects of engineering, chemistry, metallurgy, &c. We do not think that in its purely scientific contents it is likely to be of advantage to English students. The first part, devoted to the subject of crystallography, is rather incomplete and unsatisfactory, even if regard be had to the main purpose of the work. As usual, in the figure of Wollaston's goniometer the crystal is represented as adjusted in a way that every practical student is immediately taught to avoid. Nor will the chemical formulæ meet with the favour of English students: though the atomic weights of oxygen and silicon are given as 16 and 28 respectively, silica appears throughout as SiO_2 , water is still HO , while to nitre is assigned the formula $\text{KO} \cdot \text{AzO}_5$. Further, the ordinary symbols for the atoms are occasionally, as in the forty-nine formulæ of pp. 423-5, used to signify equivalent proportions of the oxides; olivine, for instance, being given as $(\text{Mg} \cdot \text{fe})\text{Si}$. The classification is likewise ancient; in the description of the species alum stone immediately follows the oriental chrysolite, a precious stone, merely because both substances contain alumina. In its explanation of the uses which have been discovered

for the various subjects of the mineral kingdom, the work, however, supplies a want which has been long felt, and it will prove convenient for purpose of reference. The amount of detail will be better appreciated if we mention that in the description of the uses of carbonate of lime even the hammers used by stonemasons are specially figured.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

Photographing the Aurora Borealis

I SHOULD be obliged if I might be permitted to state, with reference to the negative of the aurora borealis obtained by Mr. Tromholt in Christiania on March 15 (NATURE, vol. xxxi. p. 479)—the first ever obtained—that he now informs me that, although the plate was exposed for eight and a half minutes, the said impression is so faint and imperfect that it cannot be reproduced as a positive. My object in asking to be allowed to mention this important fact is to show that the opinion expressed by Mr. Tromholt in his work just published, "Under the Rays of the Aurora Borealis," that it is almost impossible to photograph the aurora borealis on account of the small strength of light and its limited chemical action, may be said still to hold good in the main.

CARL SIEWERS

Speed and Velocity

YOUR reviewer of Williamson and Tarleton's "Dynamics" (NATURE, February 26, p. 385) speaks of the confusion therein of *speed* and *velocity*. Does he mean that these words should now be used in distinct senses? If so, would he kindly specify the distinction, which is unknown to me and my friends.

B.

[Certainly. Velocity is a directed quantity, or Vector. Speed is its Tensor.—YOUR REVIEWER.]

Time.—Thunderbolts.—Vision.—Sunglows

ON my return from a magnetic tour along the Red Sea, I ask leave to refer to some back numbers of NATURE. In vol. xxxi. p. 125, Latimer Clark is quite right when he says that mean and sidereal time ought to be distinguished by names. I should prefer a step farther, and use for the latter the decimal angle, thus abolishing our frequent and tiresome conversion of time into space, and *vice versa*. The resulting advantages would be obvious.

Answering Herr Von Danckelman's remarks in vol. xxxi. p. 127, I beg leave to quote my memoir, "Sur le Tonnerre en Éthiopie," published in 1858 by the French Institute, among its *Mémoires des Savants Étrangers*. Facts mentioned there do not support the opinion that fatal thunderbolts are all but unheard of in Tropical Africa.

In your published remarks on vision, is it not Lord Rayleigh who says that the supposed superiority of eyesight among savages may be explained otherwise? Years ago, when reading Bergmann's travels among the Kalmouks, I noticed his remark that when examining camels returning to the fold, those natives distinguished sexes with their naked eyes just as well as he could through his excellent field-glass. In conclusion, Bergmann says that savage eyes are superior to civilised ones, or something to that effect. I must confess that I then accepted his opinion as being admirably warranted by the quoted facts. However, some time afterwards I was travelling on foot in the Pyrenees with a Basque illiterate peasant, and a splendid refractor by Cauchoix, which I proudly carried myself. My companion having tauntingly asked me why I had not left that lumber at home, I gave him, foolishly, a lecture on optics, and wound up by saying that the glass enabled me to distinguish a cow from an ox, even from that distant hill. He said he could do as much without my lumber. I then selected a cow grazing, and asked him what that was. "Wait till the brute walks," said the

peasant; and at its first step he exclaimed: "it is a cow." I tried him, then, several times, and never found him in fault. He affirmed that cows and oxen do not lift their legs in the same way. May I request your rural readers to tell us whether that remark applies to English cattle? When on the Atlantic a sail was announced for the first time. I could perceive nothing, because I had not yet learnt what kind of a hazy thing I should distinguish. Having then sharp eyesight, I succeeded after a short practice, in discerning distant sails before any of my companions, and could turn tables on them by repeating their own saying, "*Ça crève les yeux*."

To your lore on far-sightedness in vol. xxxi. p. 506, allow me to add two instances. Zach saw from Marseilles, Mount Canigou (2700 m.), at a distance of 158 English miles; he had calculated the true azimuth beforehand, and says that the peak bursts into view at sunset. Sir W. Jones informs us that the Himalayas have been seen at the great distance of 244 miles. I quote this from Carr's "Synopsis," a useful volume, which I regret to see behindhand in many cases since the death of its clever author.

May I intrude here a comment on our mysterious sunglows? My companion having a nice eye for discriminating colours, has confirmed my notion that on rising from the horizon the successive nuances of fiery red, faint red, rose, mallow, prussian blue, and green, are not the same on consecutive days, although thermometer, barometer, and wind have not changed. This suggests the hypothesis either that the lower strata of our atmosphere undergoes changes otherwise unperceived, or that there are maxima, minima, and perhaps regular epochs in the phenomenon. To those who, unlike myself, remain stationary under a rainless sky like that of Egypt, I would recommend a careful record of these changes, at least during a few months.

Cairo, April 22

ANTOINE D'ABBADIE

Plutarch on Petroleum

THERE is in "Plutarch's Lives," in the life of Alexander, an interesting notice of the petroleum of Media; I have not found any mention of this passage in "Plutarch" either in encyclopædia or chemical dictionary; I trust, therefore, that you will give me the opportunity of reproducing it in NATURE. I transcribe the passage from the translation of John and William Langhorne (9th edition, London, 1805):—

"... and in the district of Ecbatana he (Alexander) was particularly struck with a gulph of fire, which streamed continually as from an inexhaustible source. He admired also a flood of naptha, not far from the gulph, which flowed in such abundance that it formed a lake. The naptha in many respects resembles the bitumen, but it is much more inflammable. Before any fire touches it, it catches light from a flame at some distance, and often kindles all the intermediate air. The barbarians, to show the king its force and the subtlety of its nature, scattered some drops of it in the street which led to his lodgings; and, standing at one end, they applied their torches to some of the first drops, for it was night. The flame communicated itself swifter than thought, and the street was instantaneously all on fire."

W. H. DEERING

Chemical Department, Royal Arsenal, Woolwich, May 6

Hut Circles

THE remains of the ancient British habitations on the downs on both sides of Dunstable are fairly well known to archæologists. I have often wished to expose the floor of one or more of these circles, as the task could be accomplished with a spade in an hour or two. It is, however, far better that the remains should be left alone, as it is not likely that anything would be found beyond a few flakes and the other simple forms, such as are abundant in the cultivated fields close to the huts.

On passing some of the circles on the east side of Dunstable, in the railway, about ten days ago, I noticed that the remains were covered with whitish soil instead of the normal green of the short pasture belonging to the downs. Thinking that some persons had been digging at these antiquities, I took an early opportunity of going to the spot. On reaching the circles I found they had been undermined in every direction by a large number of moles. A great deal of the material from the actual floors had been brought to the surface, and on examining this chalk rubble—for such it was—I had no difficulty in securing two or three handfuls of flint flakes. Mingled with them were